

Photocatalytic Membrane Reactor for Water Treatment

Problem Statement: According to an estimate, 700,000 tonnes of more than 100,000 different dyes are produced, of which 15% of dyes are directly released into the effluents. Like dyes, pharmaceutical compounds are also a major problem, and these compounds are present in ng/L; therefore, it is difficult to remove them from water. There are no cost-effective technologies to remove these contaminants. Hence, most dye and pharmaceutical industries do not treat their effluent, which leads to water pollution. These dyes, their byproducts, and pharmaceutical compounds are recalcitrant, carcinogenic, and very tough to degrade under natural conditions. In addition to their unacceptable appearance and toxic effect after their breakdown, they may contaminate the nearby soil, and surface water, becoming a major global environmental pollution challenge. Currently, technologies available to remove the dye and pharmaceutical compounds from water are adsorption, simple membrane

separation, ozonation, electro dialysis etc. However, these technologies are inefficient in removing dyes and most of the pharmaceutical compounds from water.

Uniqueness of the Solution: Photocatalysts have the ability to degrade organic compounds in the presence of UV or Sunlight. The IIT Bombay team is leveraging this advantage and developing the coupling system with a cost-effective hollow fibre membrane. This membrane will remove the dye and pharmaceutical compounds from contaminated water. In addition, the technology is used to make a low-cost photocatalytic membrane reactor and provide it to Indian industries.

Current Status of Technology: The Photocatalytic Membrane Reactor for Water Treatment is in the preliminary stages. Laboratory trials are being performed.

Societal Impact: The use of membrane

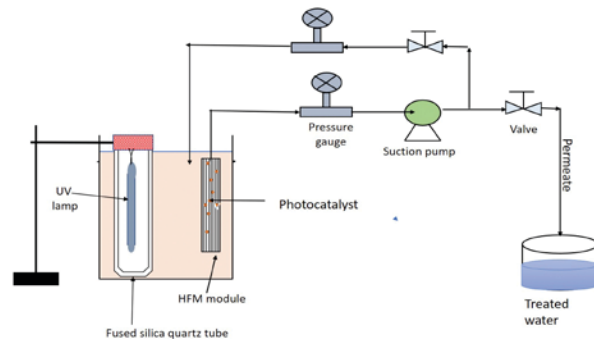


Fig: Photocatalytic membrane reactor for industrial dye and pharmaceuticals wastewater treatment

reactors helps to clean the effluent water to make clean water more accessible.

Patent(s): Nil

Relevant Industries: Water, Materials, Clean Energy.

Faculty: Prof. Jayesh Bellare, Chemical Engineering.